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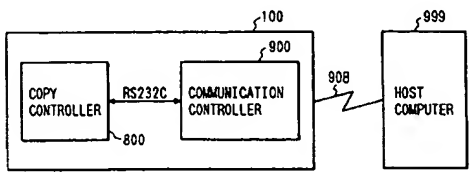
(54) Equipment control apparatus.

(57) An equipment control apparatus in a system having an input for entering data on the conditions of equipment from the equipment, a communication unit for communicating with the apparatus located at a distance, and a control unit for exerting control in such a way as to transmit the data to the apparatus located at a distance through the steps of interrupting communication once on receiving a call from the apparatus requesting the data and then calling the apparatus located at a distance via the communication unit.

FIG. 1



EP 0 513 549 A2

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to an equipment control apparatus for transmitting data on equipment conditions to a centralized control unit by means of communication.

Related Background Art

A demand for copying machines provided with various additional functions and their sophistication is on the increase. As copying machines become complicated in not only construction but also function and as the number of copying machines in a business increases, the tendency is for the normal operating condition of and functional data on the copying machines to be kept under the centralized control of the administrative division of such a business or the specialized trade in order to facilitate proper maintenance and repair work, to say nothing of control of the use and operation of them.

For the reason stated above, known copying machines, as diclosed in U.S. Patent No. 5,084,875, is equipped with communication control means for keeping communication with external units through communication circuits so that data can be exchanged, periodically or whenever necessary, with the external units installed in the administrative division or other places.

When a sort of copying machine proposed is requested to start communication through a communication circuit, it is so designed as to start communication on condition that an access is judged licit after an identification code (hereinafter called ID) and a password are checked.

Notwithstanding, an illicit access may be gained in case the ID and the password have leaked out because an ID as well as a password is only the way of recognizing a partner requesting a communication start and this has posed a serious problem in keeping secrecy. It is also necessary to provide means for storing IDs and passwords of authorized partners on the part of a copying machine to accept any request for a communication start.

The means for recognizing a request for a communication start operates to recognize the request therefor according to a specific protocol after identifying the ID and password of a partner requesting a communication start. Consequently, the necessity of providing IDs and passwords, decision means and procedures tends to complicate the construction and control of such means. Moreover, the problem is that an improper access may be gained when the IDs and the passwords have leaked out.

SUMMARY OF THE INVENTION

An object of the present invention is to provide an equipment control apparatus free from shortcomings deriving from the foregoing problems.

A further object of the present invention is to provide an improved equipment control apparatus.

Another object of the present invention is to provide an apparatus effective in excluding improper access to ensure secrecy.

An additional object of the present invention is to provide an apparatus effective in excluding improper access and detecting any request for a communication start through a simple procedure to ensure data transmission to only a predetermined communication partner and secrecy to a large extent.

Still another object of the present invention is to provide an apparatus capable of transmitting data through an external communication circuit by identifying a partner requesting a communication start each time the request is made by means of an ID and a password without relying on a specific protocol for recognition and while excluding an improper request for a communication start, making certain of a proper partner requesting such a communication start using simple means.

Other objects and features of the present invention may best be understood by reference to the following description taken in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic block diagram illustrating a system configuration of the present invention.

Fig. 2 is a block diagram illustrating a copy controller 800 and a communication controller 900.

Fig. 3 is a sectional view of a copying machine embodying the present invention.

Fig. 4 is an external view of an operating panel embodying the present invention.

Fig. 5 is a control flowchart of the first embodiment.

Fig. 6 is a control flowchart of the second embodiment.

Fig. 7 is a control flowchart of the third embodiment.

Fig. 8 is a control flowchart of a subroutine of the third embodiment.

Fig. 9 is a control flowchart of the fourth embodiment.

Fig. 10 is a control flowchart of a subroutine of the fourth embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to embodiments, copying machines ac-

cording to the present invention will subsequently be described.

Fig. 1 is a block diagram illustrating the configuration of a copying machine embodying the present invention.

In Fig. 1, numeral 100 denotes a copying machine body (copier), 800 a copy controller for controlling copying operations, 900 a communication controller (a modem board) for the transmission and reception of data with an external communication circuit, 908 a public line of telecommunication as a communication circuit, and 999 a host computer as an external unit installed in an administrative section or the like and used for controlling the operation of the copying machine 100.

Under the control of the copy controller 800 and the communication controller 900, the copying operation of the copying machine 100, data storage and communication with the external unit 999 via the external communication circuit 908 are performed.

A description will subsequently be given of the copy controller 800 and the communication controller 900.

Fig. 2 is a block diagram illustrating the copy controller 800 and the communication controller 900.

In Fig. 2, numeral 801 denotes a central arithmetic processing unit (hereinafter called CPU) for controlling the whole copying machine, and 802 a read only memory (ROM) stored with the steps (a control program) of controlling the copying machine 100. CPU 801 controls each component unit connected thereto via a bus in conformity with the programmed steps stored in the ROM 802.

Moreover, the CPU 801 also functions as what detects whether or not the copying machine 100 is in a state-condition ready for data transmission toward the external unit.

Numeral 803 denotes a random access memory (hereinafter called RAM) as a main storage for use as a work storage area and for use in storing input/output data including telephone numbers necessary for starting communication with the external unit 999.

The RAM 803 stores a plurality of kinds of data to be transmitted to the external unit 999.

Numeral 804 denotes an input/output unit (hereinafter called I/O) which applied a control signal of the CPU 801 to the load of a main motor 113 and the like and transmits to the CPU 801 the signal received from the sensor or the like of a fixer.

The CPU 801 holds a set value on copying frequency corresponding to each of the kinds of the abovementioned data stored in the RAM 803 and compares the set value with a coefficient value of copying frequency counted correspondingly to each set value thereon.

Numeral 806 denotes a service mode switch for use in selecting, changing and reentering the set value of copying frequency. In addition, on receiving signals from various sensors, the CPU 801 checks the consumption, replacement and supplement of consumables.

The communication controller 900 for controlling communication with the communication circuit 908 is controlled by an internal CPU 901. Numeral 902 denotes a read only memory (ROM) for storing communication control, connection procedure programs and the like. The copy controller 800 of the copying machine body 100 and the communication controller 900 are connected via RS - 232C interfaces 805, 907. When data is transferred from the copy controller 800 of the copying machine body 100 via the RS - 232C interface 907, the data thus transferred is temporarily held in RAM 903 provides in the communication controller 900. The CPU 901 controls NCU 906 when data transfer from the copy controller 800 is completed and connects the communication circuit to the external unit 999 so as to transfer the data outside via NCU 906.

When data is otherwise transferred from the external unit 999, the data thus transferred is temporarily held in the RAM 903 before being transferred to the copy controller 800 via the RS - 232C interfaces 805, 907 by request from the copy controller 800.

In this case, the data means the data and information stored in the RAM 803 as data storage means and the request for data transfer includes what is made at the time copy control irregularities or clogging with paper arise on the copying machine side, at regular report time of the copying machine, and during a control process as will be described later, and what is made when data are collected on the external administrative side.

Fig. 3 is a sectional view of the copying machine 100 illustrative of its configuration, which together with the operation will be described.

Numeral 100 denotes the copying machine body 100, 200 a recurring automatic document feeder (RDF) for automatically feeding originals, 300 a sorter for sorting sheets of paper copied, 400 an automatic computer form feeder (CFF). RDF 200, the sorter 300 and the CFF 400 may freely be attached in combination to the copying machine body 100.

The configuration of the copying machine body 100 will subsequently be described.

In Fig. 3, numeral 101 denotes an original glass plate for mounting an original, 102 an optical system for reading the original, the optical system being composed of an exposure lamp 103 for irradiating the original, a scanning mirror 102a, a lens 102b, a motor 104 and the like. While the scanning mirror 102a, the lens 102b and the exposure lamp 103 are kept moving by the motor 104, the exposure lamp 103 is employed for irradiating the original and the light reflected from the original is caused to irradiate a photoreceptor drum 105 via the scanning mirror 102a and the lens 102b.

There are installed a high voltage unit 106, a

blank exposure unit 107, a potential sensor 108, a developer 109, a transfer charge 110, a separation charger 111, and a cleaning device 112 around the photoreceptor drum 105, these in combination being used to record an image on the paper supplied.

The photoreceptor drum 105 is rotated by the main motor 113 in the direction of an arrow and kept charged by the high voltage unit 106 with corona charging. When the photoreceptor drum 105 is irradiated with the light reflected from the original via the optical system 102, an electrostatic latent image is formed thereon. The electrostatic latent image is developed by the developer 109 into a visual toner image.

On the other and, transfer paper separated by pickup rollers 116, 117 from an upper row cassette 114 or a lower row cassette 115 and conveyed by paper feed rollers 118, 119 into the machine body 100 is fed to the photoreceptor drum 105 at such timing that a resist roller 120 makes the leading end of the transfer paper conform to that of the toner image on the photoreceptor drum 105. The toner image on the photoreceptor drum 105 is thus transferred by the transfer charger 110 onto the transfer paper. After the image transfer is completed, the transfer paper is separated by the separation charger 111 from the photoreceptor drum 105 and guided by a conveyer belt 121 to a fixer 122 where the toner image is fixed by pressurizing and heating. Then the transfer paper is discharged by a discharge roller 123 from the copying machine body 100. In addition, the surface of the photoreceptor drum 105 is cleaned by the cleaning device 112.

The copying machine body 100 is equipped with a deck 124 capable of accommodating, for instance, 4,000 sheets of transfer paper. The filter 125 of the deck 124 rises in proportion to the quantity of transfer paper so that the transfer paper always abuts against a paper feed roller 126.

The transfer paper sent out of the discharge roller 123 is guided by a paper discharge flapper 127 to either a two-side multiple recording side or a discharge side. Numeral 128 denotes a lower convey path used to turn over the transfer paper sent out of the discharge roller 123 by means of a reversing path 129 and to guide the paper to a paper refeed tray 130.

Numeral 131 denotes a multiple flapper for switching a two-side multiple recording path. When this flapper is turned left, the transfer paper is not guided to the reversing path 129 but directly guided to the lower convey path 128. Numeral 132 denotes a paper feed roller for supplying transfer paper via a path 133 toward the photoreceptor drum 105, and 134 a discharge roller for discharging the transfer paper switched to the discharge side by the discharge flapper 127 outside, the discharge roller being disposed in the vicinity of the discharge flapper 127.

At the time of two-side recording (two-side copying) and multiple recording (multiple copying), the discharge flapper 127 is raised and the copied transfer paper that has been turned over is delivered via the reversing path 129 and the lower convey path 128 onto the paper refeed tray. The multiple flapper 131 is turned right at the time of two-side recording, whereas it is turned left at the time of multiple recording. The the transfer paper on the paper refeed tray 130 is guided by the paper feed roller 132 via the path 133 to the resist roller 120 sheet by sheet from the bottom.

When the reversed transfer paper is discharged from the copying machine body 100, the discharge flapper 127 is lifted and the flapper 131 is brought down to the right. The copied transfer paper is conveyed to the convey path side 129 and then to the side of a second feed roller 141 by means of a reverse roller 142 after the trailing end of the transfer paper has passed a first feed roller 140. Further, the transfer paper is turned over by the discharge roller 134 before being discharged from the machine body.

An operating panel will subsequently be described.

Fig. 4 is an external view of an operating panel 600 of the copying machine body 100.

Numeral 601 denotes an asterisk (*) key for use when the operator sets a binding margin and the size of erasing an original frame in a set mode, 627 a cursor key for use when a set item in the set mode is selected, 628 an OK key for use when the set contents in the set mode is decided.

Numeral 606 denotes an auto reset key to be pressed when a standard mode is restored. This auto reset key 606 is also pressed when an auto shut-off condition is set back to the standard mode.

Numeral 605 denotes a copy start key to be pressed when copying is started.

Numeral 604 denotes a clear/stop key which functions as a clear key during standby and as a stopper during the recording operation. The clear/stop key 604 is pressed to release the set number of sheets of paper or interrupt the continuous copying operation. When this key is pressed, the copying operation is stopped after the termination of what is involved.

Numeral 603 denotes ten keys to be pressed when the number of copies is set and to be also used to set the asterisk (*) mode. Numeral 619 denotes memory keys by which modes for frequent used by the user can be registered. In this case, there are four modes M1 - M4 that can be recorded.

Numerals 611, 612 denote copy density keys to be pressed when the copy density is manually adjusted. Numeral 613 denotes an AE key to be pressed when the copy density is automatically adjusted in proportion to the density of an original or when AE (automatic exposure adjustment) is released so as to switch AE to manual density adjustment.

Numeral 607 denotes a copying paper selection

key to be pressed when an upper row paper lifter 119, a lower row paper lifter 115, the paper deck 124, or a multiple manual paper feed 150 is chosen. While an original remains on the RDF 200, this copying paper selection key 607 may be used to select APS (automatic paper cassette selection). When the APS is selected, a cassette equal in size to the original is automatically selected.

Numeral 610 denotes an equimultiple key to be pressed when an equimultiple (full-scale) copy is taken. Numeral 616 denotes an auto variable multiple key to be pressed when an original image is automatically adjusted to the size of predetermined transfer paper for reduction magnification.

Numeral 626 denotes a two-side key to be pressed to take a two-side copy from a one-side original, a two-side copy from a two-side original or a one-side copy from a two-side original. Numeral 625 denotes a binding margin key for use in preparing a predetermined length of binding margin on the left-hand side of transfer paper. Numeral 624 denotes a photographic key to be pressed when a photographic original is copied. Numeral 623 denotes a multiple key to be pressed to prepare (synthesize) an image on the same side of transfer paper from two different originals.

Numeral 620 denotes an original frame erasing key to be pressed when the user erases the frame of an original of fixed size, which is set by the asterisk key 601. Numeral 621 denotes a sheet frame erasing key to be pressed when the frame of an original is erased in conformity with the size of copying paper.

Numeral 629 denotes a cover mode set key to be used for preparing a cover and a back cover, and inserting a partition sheet. Numeral 630 denotes a continuous paging key to be used when the left- and right-hand sides of a spread hook are continuously copied.

Numeral 614 denotes a discharge method sort key for use in selecting a stable sorting, sorting or group discharging method. While the stable sorter 300 is kept connected, it is possible to release the selection of a stable sorting mode, sorting mode or grouping mode, or otherwise the selection mode itself.

Numeral 631 denotes a reservation key to be used when a copy mode with respect to the original reserved and mounted on a reservation tray 210 and when the reservation setting is released. Numeral 632 denotes a reservation set key to be used as a determination key at the time a reservation mode is set.

Numeral 633 denotes a guide key to be used when a description of the function of each key is displayed on a message display 701.

Numeral 701 denotes the message display for displaying copying and communication data or a liquid crystal (LCD) capable of displaying characters and figures with 96 x 129 dots. The message display 701 is to display, for instance, the number of copies set by the then keys 603; the copying scale factor set by fixed multiple varying keys 608, 609, the equimultiple key 610 and zooming keys 617, 618; the paper size selected by the copying paper selection key 607; a message indicating the state of the copying machine body 100; a guide message indicating operational steps; and contents of other modes to be set.

Numeral 704 denotes an AE indicator to be lighted when AE (for automatic exposure adjustment) is selected by the AE key. Numeral 709 denotes a pre-heat indicator to be lighted in the pre-heat state.

When the RDF 200 is used in the standard mode, the set conditions include one sheet of copying paper, the density AE mode, auto paper selection, equimultiple, and one-side copying from a one-side original. When the RDF 200 is not used in the standard mode, the conditions include one sheet of copying paper, a density manual mode, equimultiple, one-side copying from a one-side original. The difference between the used and not use of the RDF 200 is ascribed to the fact that whether or not an original is set on the RDF 200.

A description will subsequently be given of communication control through the communication circuit of the first embodiment. Fig. 5 is a flowchart illustrating control of the CPU 801 exerted when the communication circuit is used for communication.

First, a decision is made on whether or not the copy key 605 is held down (Step S51) and the copying operation is performed when it is held down (Step S52). After the termination of the copying operation, a decision is made on the presence or absence of a request for a communication start (Step S53) and if the request therefor exists, a request for circuit disconnection is directed to the communication controller 900 (Step S54). The referring to the RAM 803 stored with communication partners, the communication controller 900 is requested to connect a partner via the communication circuit (Step S55). Predetermined data is sent out (Step S57) after the connection with the circuit is confirmed (Step S56). On the termination of the data transmission, turning the copy key (605) on is waited for again (Step S51).

In this way, only the prestored communication partners is connected in reply to the request for a communication start made via the communication circuit under the control of the CPU 801, so that no data is obtainable even though a request for data transmission is wickedly made from the outside.

Fig. 6 is a flowchart of the second embodiment, illustrating control of the CPU 901 exerted when the communication circuit is used for communication.

First, a request for a communication start via the communication circuit from the outside is waited for (Step S61) and if the request therefor exists, the circuit is disconnected once (Step S62). Referring to the RAM 903 stored with communication partners, a predetermined partner is then connected via the communication circuit (Step S63). After the connection with

the communication circuit is effected, data to be sent out of the copy controller 800 is received (Step S64) and subsequently delivered via the communication circuit to the partner (Step S65). After the termination of data transmission, a request for a communication start via the communication circuit from the outside is waited for again.

Communication with the prestored partners can thus be established through the above-mentioned control operation.

In this way, the copying machine is capable of performing the copying operation under the control of copy control means and of transmitting and receiving data via the communication circuit under the control of the communication control means.

When a request for a communication start is received by means for detecting the request therefor from the external communication circuit by following the procedure for the communication start, data is transmitted to the communication partner connected through a series of steps taken by circuit disconnection means to cut the connection with the external communication circuit once under the control of communication reconnection control means and then by external circuit connection means to connect the external communication circuit to the partner stored in communication partner storage means. Data and the like can thus be transmitted to only a predetermined partner. Therefore, a copying machine capable of excluding an improper access and greatly ensuring secrecy is provided.

Communication control of the third embodiment will subsequently be described.

Fig. 7 is a flowchart of communication control to be exerted by the CPU 901.

First, a request for a communication start via the communication circuit 908 is waited for (Step S71) and if the request therefor exists, the circuit is disconnected once (Step S72). Referring to the RAM 903 stored with communication partners, a predetermined partners is then connected via the communication circuit (Step S73). After the connection with the communication circuit is effected, data to be sent out of the copy controller 800 is received (Step S74) and subsequently delivered via the communication circuit 908 to the partner (Step S75). After the termination of data transmission, a request for a communication start via the communication circuit 908 from the outside is waited for again (Step S71).

Fig. 8 is a control flowchart illustrating a subroutine for detecting the request for a communication start from the communication circuit 908.

First, a decision is made on whether or not a call signal is received (Step S81). When no call signal is received, a return instruction is restored at no request for the communication start (Step S84). If there exists the call signal, the number of continuous call signals is monitored and counted up to the Nth occurrence of the call signal (Step S82). The return instruction is then restored with the occurrence of the request for the communication start (Step S83).

With the above-mentioned control, a request for a communication start can be detected by simple means and transmission of the request can be effected for only the partner stored in the storage means of communication partners.

In this way, the copying machine is controlled by the copy control means so as to perform the copying operation and is controlled by the communication control means so as to exchange data via the communication circuit with the external device.

When a request for a communication start is received by means for detecting the request therefor by detecting the call signal repeated a predetermined number of times from the external communication circuit by following the procedure for the communication start, data is transmitted to the communication partner connected through a series of steps taken by the circuit disconnection means to cut the connection with the external communication circuit once under the control of the communication reconnection control means and then by the external circuit connection means to connect the external communication circuit to the partner stored in the communication partner storage means. Data and the like can simply be transmitted to only a predetermined partner without the necessity of identifying the ID and the password of the partner requesting a communication start, the troublesome procedure for a specific protocol for recognition, and the storage means therefor. Consequently, a copying machine capable of excluding an improper access and greatly ensuring secrecy is provided.

Communication control of the fourth embodiment will subsequently be described.

Fig. 9 is a flowchart of communication control to be exerted by the communication controller 900.

First, a request for a communication start via the communication circuit 908 is waited for (step S91) and if the request therefor exists, the circuit is disconnected once by the NCU 906 after the contents thereof are identified (Step S92). A predetermined partner corresponding to the request for the communication start and stored in the RAM 903 is then connected by the NCU 906 to the communication circuit (Step S93). Data to be sent out of the copy controller 800 is then received (Step S94) and subsequently delivered via the communication circuit 908 to the partner (Step S95). After the termination of data transmission, a request for a communication start via the communication circuit 908 is waited for again.

Fig. 10 is a control flowchart illustrating a subroutine for detecting the request for a communication start from the communication circuit 908 at Step S91.

First, a decision is made on whether or not a call signal is received (Step S101). When no call signal is received, a return instruction is restored at no request

for a communication start (Step S105). If there exists the call signal, the circuit is connected (Step S102) and a decision is made on whether or not the data initially received in a predetermined specific one (Step S103). The return instruction is then restored with the occurrence of the request for the communication start (Step S104) and the return instruction is also restored at no request for a communication start when the data received is not the specific one (Step S105).

When a request for a communication start is received by the copying machine from the external communication circuit, the communication control means detects a partner requesting communication from the specific data in the signal requesting the communication start via the means for detecting a request for a communication start, cuts the connection with the external communication circuit once, connects the circuit to the communication partner stored in the storage means of communication partners, and effects data transmission from the copy control means. As a result, data can be transmitted to only the predetermined partner stored in the storage means of communication partners, judging from the specific data contained in the signal requesting a communication start without the necessity of identifying the ID and the password of the partner requesting a communication start and of the troublesome procedure for a specific protocol for recognition. Therefore, procedures for requesting data communication and decision-making thereon are simplified and facilitated. The means for storing IDs and passwords can also be dispensed with. Moreover, data is prevented from being inadvertently transmitted to partners other than those stored in the storage means of communication partners.

The present invention may be applicable to not only the copying machines in the foregoing embodiments but also image forming apparatus such as printers, facsimiles and electronic files. In addition to communication circuits, radio and optical communications may also be employed. Moreover, those embodiments above may be implemented in combination.

An equipment control apparatus in a system having an input for entering data on the conditions of equipment from the equipment, a communication unit for communicating with the apparatus located at a distance, and a control unit for exerting control in such a way as to transmit the data to the apparatus located at a distance through the steps of interrupting communication once on receiving a call from the apparatus requesting the data and then calling the apparatus located at a distance via the communication unit.

Claims

1. An equipment control apparatus comprising:

input means for entering data on the conditions of equipment from said equipment,

communication means for communicating with said apparatus located at a distance, and

control means for exerting control in such a way as to transmit said data to said apparatus located at a distance through steps of interrupting communication once on receiving a call from said apparatus requesting said data and then calling said apparatus located at a distance via said communication means.

2. An equipment control apparatus as claimed in claim 1, wherein said control presumes that a request for said data has been received when said control means detects a call signal a predetermined number of times from said apparatus located at a distance.

3. An equipment control apparatus as claimed in claim 1, wherein said control means presumes that a request for predetermined data has been received when said control means receives said data from said apparatus located at a distance.

4. An equipment control apparatus as claimed in claim 1, wherein said equipment is an image forming apparatus for forming images on a recording medium.

5. An equipment data control method in a system comprising equipment, an external apparatus located at a distance from said equipment, and a communication unit connected to said equipment and used for communicating with said external apparatus, wherein

said external apparatus is made to call said communication unit to request data on conditions of said equipment, and

said communication unit is made to interrupt communication once at a request for said data and further to transmit said data to said external apparatus by calling said external apparatus.

FIG. 1

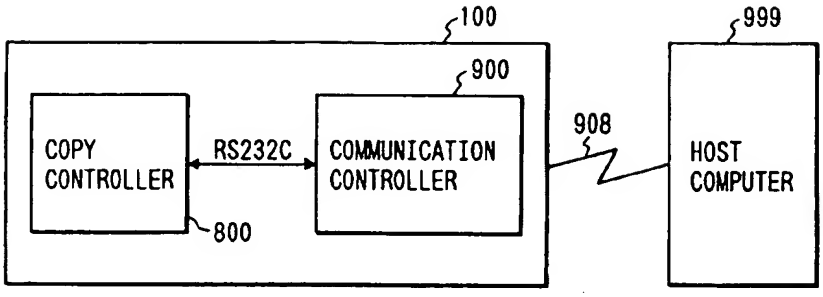
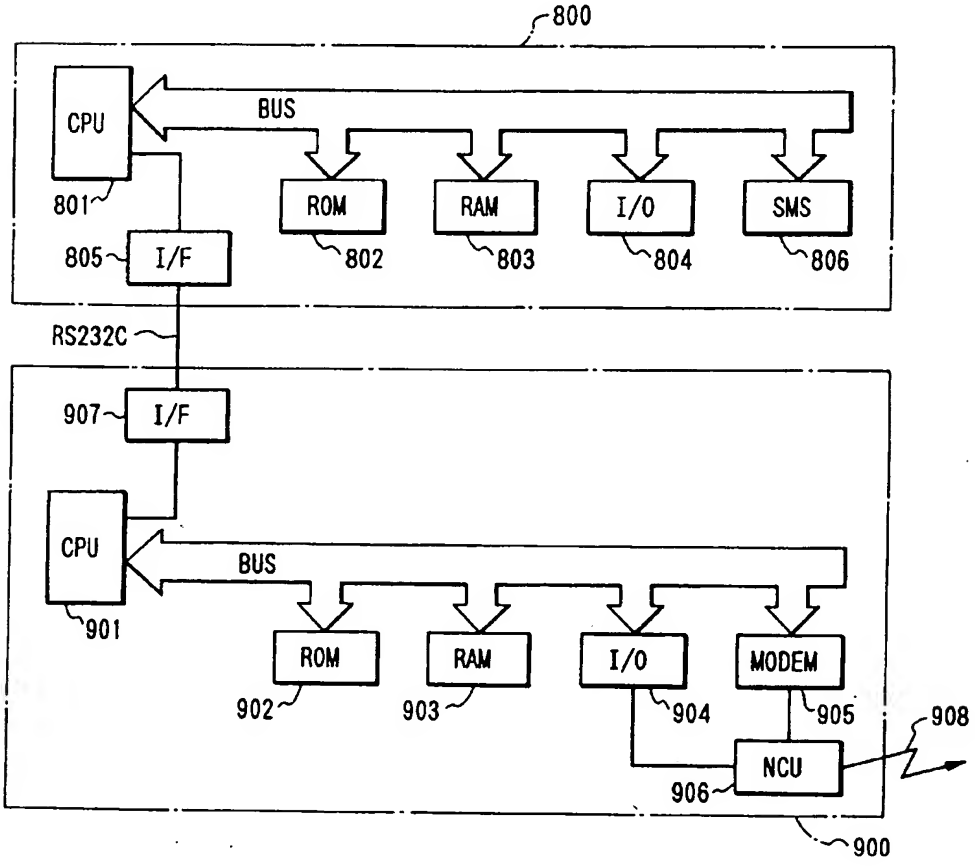

100
999
900
COPY CONTROLLER
RS232C
COMMUNICATION CONTROLLER
908
HOST COMPUTER
800

FIG. 2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BUS
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ROM
RAM
I/O
SMS
805
I/F
802
803
804
806
RS232C
907
I/F
CPU
BUS
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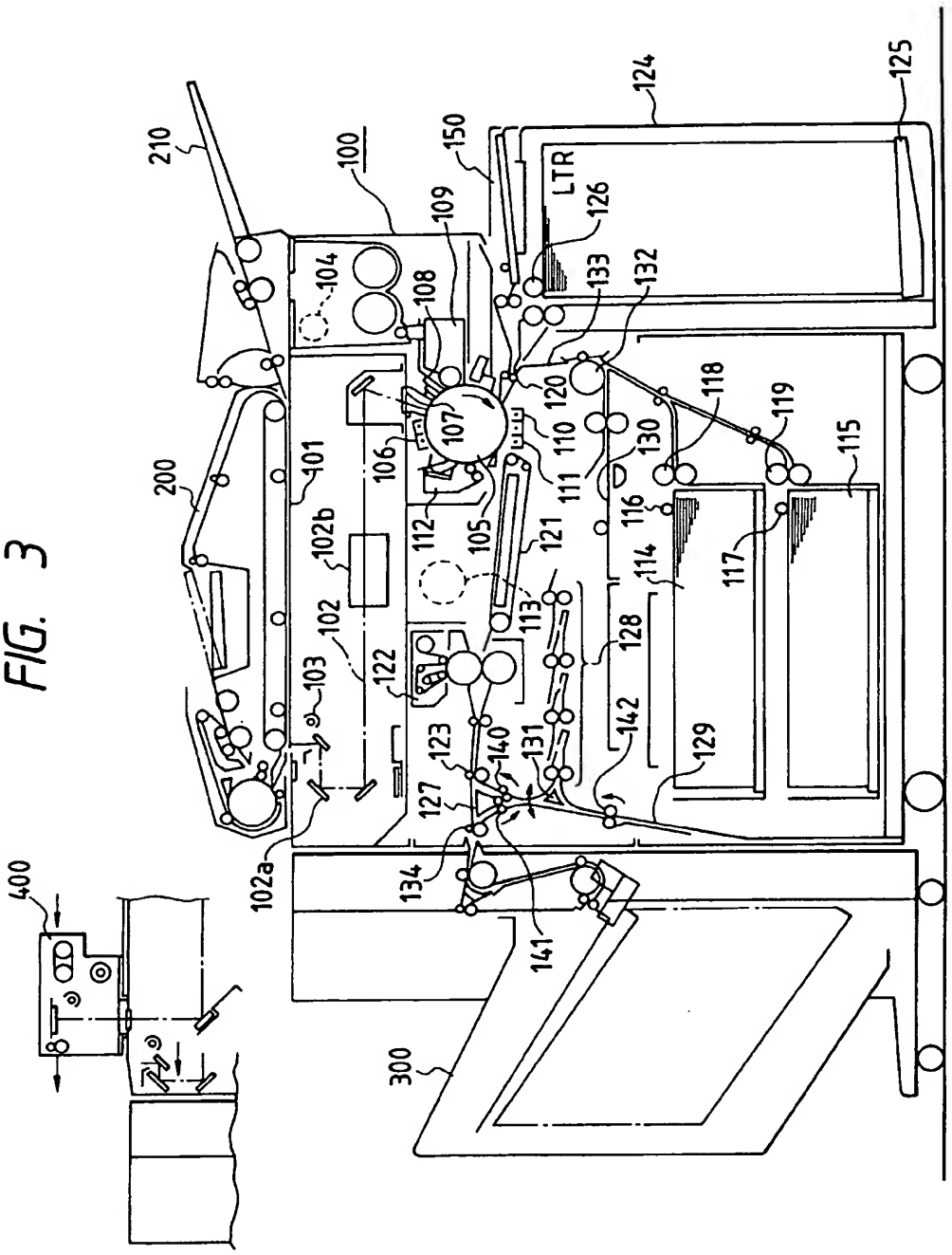
ROM
RAM
I/O
MODEM
902
903
904
905
908
NCU
906
900

FIG. 3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150
124
125
LTR
126
109
104
108
133
132
120
118
119
107
110
130
115
200
401
106
111
116
102b
112
105
121
114
117
102
113
128
103
122
142
123
140
131
129
127
102a
134
141
400
300

FIG. 4

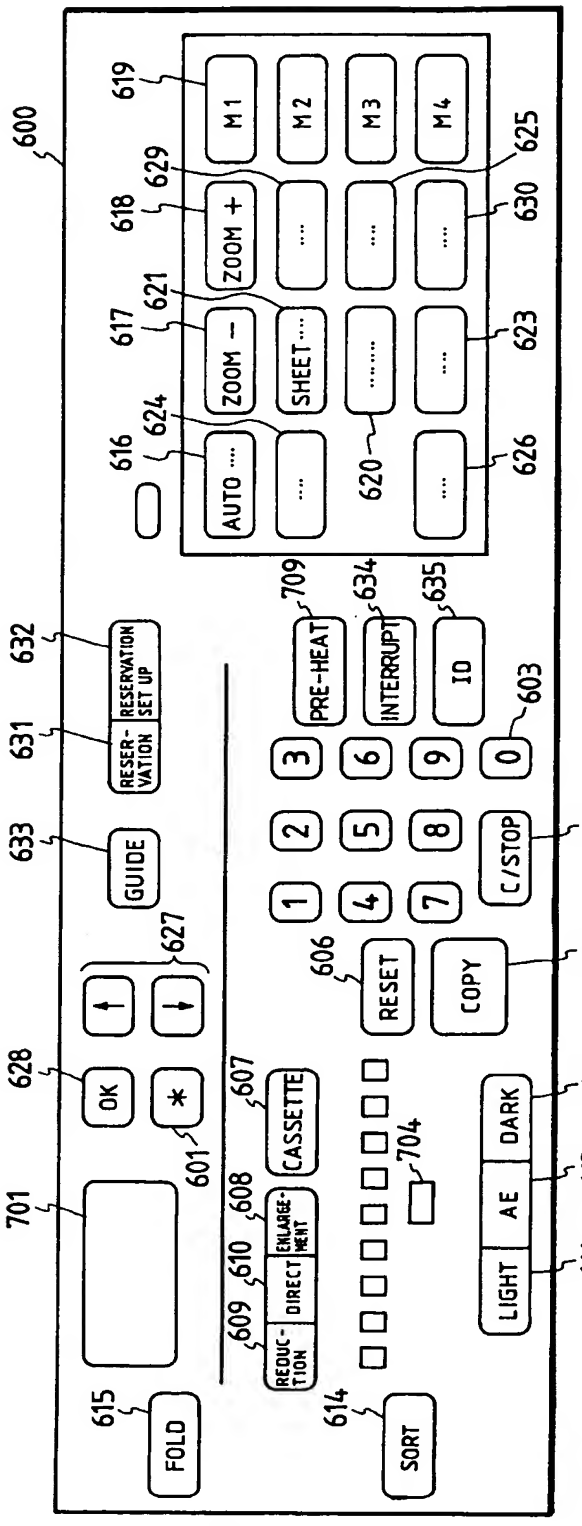

600
619
M1
M2
M3
M4
625
629
618
ZOOM +
630
621
617
ZOOM −
623
624
AUTO ....
616
626
SHEET....
620
632
RESERVATION SET UP
631
RESER-VATION
633
GUIDE
709
PRE-HEAT
634
INTERRUPT
635
ID
603
0
627
628
OK
606
RESET
COPY
605
C/STOP
604
1
2
3
4
5
6
7
8
9
607
CASSETTE
608
ENLARGE-MENT
609
REDUC-TION
610
DIRECT
704
701
601
615
FOLD
614
SORT
LIGHT
AE
DARK
611
613
612

FIG. 5

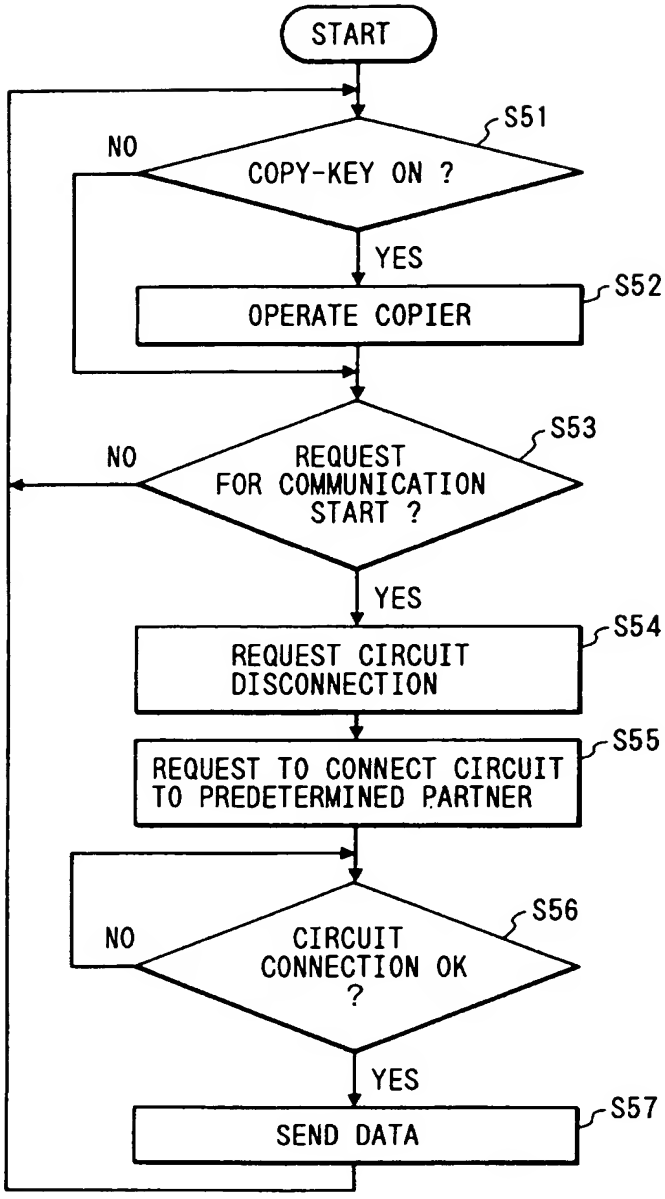

START
S51
NO
COPY-KEY ON ?
YES
S52
OPERATE COPIER
S53
NO
REQUEST FOR COMMUNICATION START ?
YES
S54
REQUEST CIRCUIT DISCONNECTION
S55
REQUEST TO CONNECT CIRCUIT TO PREDETERMINED PARTNER
S56
NO
CIRCUIT CONNECTION OK ?
YES
S57
SEND DATA

FIG. 6

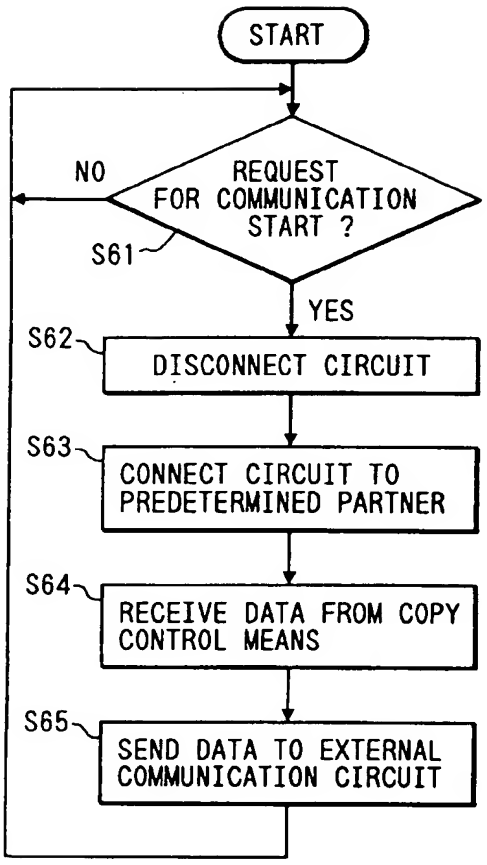

START
REQUEST FOR COMMUNICATION START ?
NO
S61
YES
S62
DISCONNECT CIRCUIT
S63
CONNECT CIRCUIT TO PREDETERMINED PARTNER
S64
RECEIVE DATA FROM COPY CONTROL MEANS
S65
SEND DATA TO EXTERNAL COMMUNICATION CIRCUIT

FIG. 7

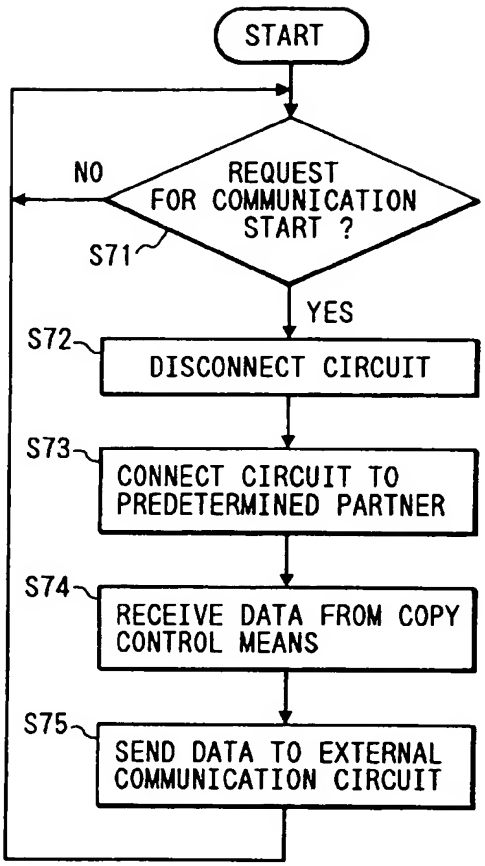

START
REQUEST FOR COMMUNICATION START ?
NO
S71
YES
S72
DISCONNECT CIRCUIT
S73
CONNECT CIRCUIT TO PREDETERMINED PARTNER
S74
RECEIVE DATA FROM COPY CONTROL MEANS
S75
SEND DATA TO EXTERNAL COMMUNICATION CIRCUIT

FIG. 8

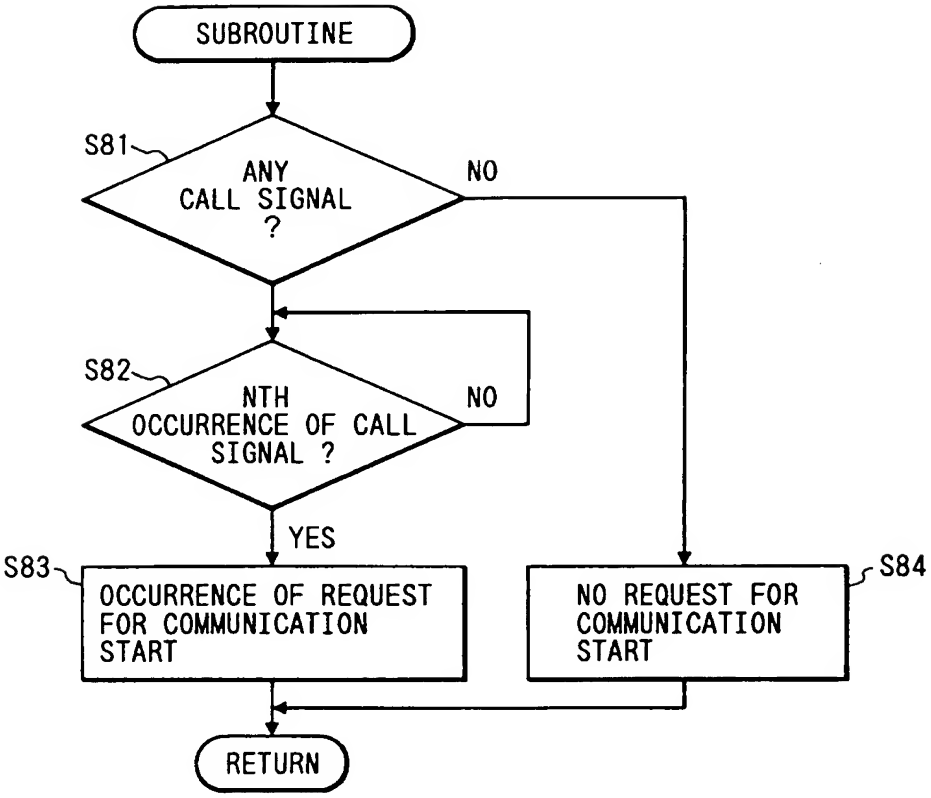

SUBROUTINE
S81
ANY CALL SIGNAL ?
NO
S82
NTH OCCURRENCE OF CALL SIGNAL ?
NO
YES
S83
OCCURRENCE OF REQUEST FOR COMMUNICATION START
S84
NO REQUEST FOR COMMUNICATION START
RETURN

FIG. 9

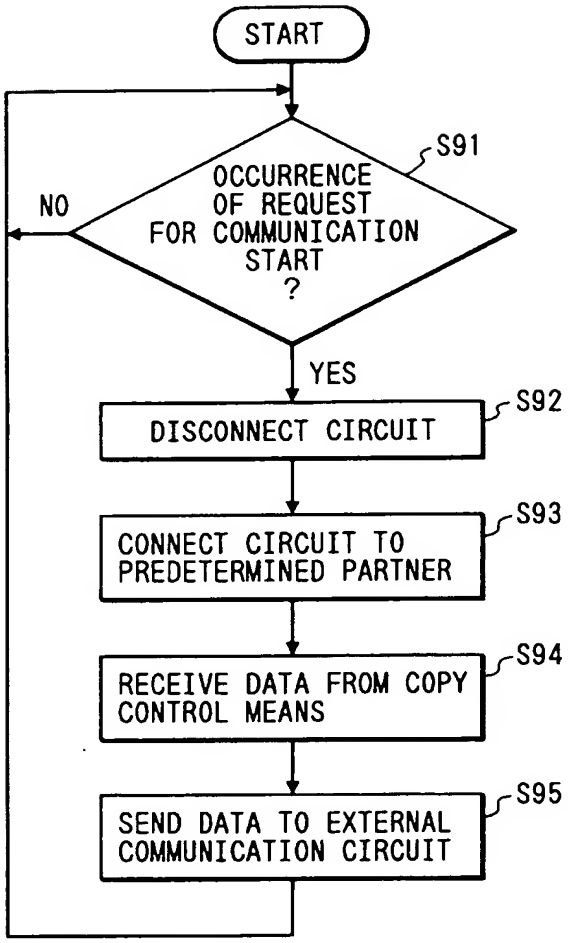
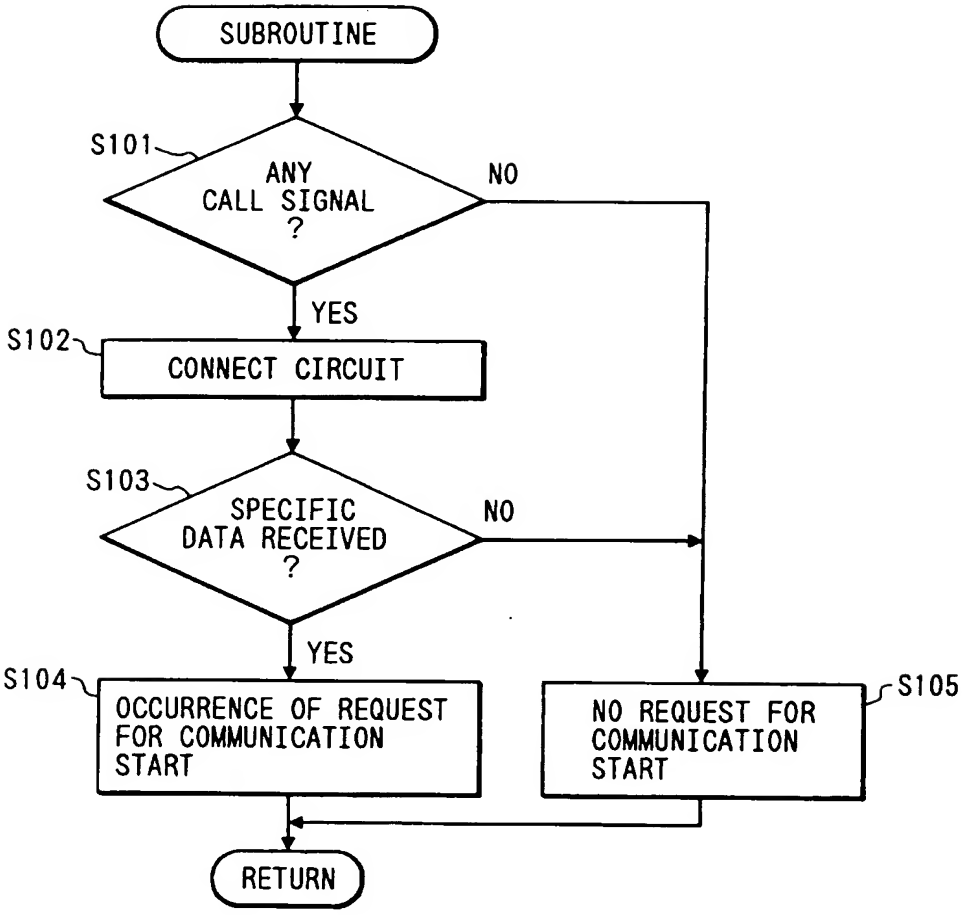

START
S91
OCCURRENCE OF REQUEST FOR COMMUNICATION START ?
NO
YES
S92
DISCONNECT CIRCUIT
S93
CONNECT CIRCUIT TO PREDETERMINED PARTNER
S94
RECEIVE DATA FROM COPY CONTROL MEANS
S95
SEND DATA TO EXTERNAL COMMUNICATION CIRCUIT

FIG. 10


SUBROUTINE
S101
ANY CALL SIGNAL ?
NO
YES
S102
CONNECT CIRCUIT
S103
SPECIFIC DATA RECEIVED ?
NO
YES
S104
OCCURRENCE OF REQUEST FOR COMMUNICATION START
S105
NO REQUEST FOR COMMUNICATION START
RETURN